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ENVIRONMENTAL RESTORATION PROJECT

**A Department of Energy Environmental Cleanup Program**

Environmental Restoration Project
Standard Operating Procedure

for:

# Surface Water Sampling

**Los Alamos**
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Los Alamos, New Mexico 87545

# Revision Log

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| R0 | 03/16/92 | Sandra E. Wagner | New Procedure | All |
| R1 | 10/24/01 | Shannon Purdue | Revised to address process changes and to meet current procedure format requirements | All |
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# Surface Water Sampling

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# Surface Water Sampling

## 1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the process for collection of surface water samples at the Los Alamos National Laboratory (Laboratory) Environmental Restoration (ER) Project.

## 2.0 SCOPE

2.1 This SOP is a manadatory document and shall be implemented by all ER Project personnel when collecting surface water samples for the ER Project.

2.2 Subcontractors performing work under the ER Project's quality program shall follow this SOP for collecting surface water samples or may use their own procedure(s) as long as the substitute meets the requirements prescribed by the ER Project Quality Management Plan, and is approved by the ER Project's Quality Program Project Leader (QPPL) before the commencement of the designated activities.

## 3.0 TRAINING

3.1 ER Project personnel using this SOP are trained by reading the procedure, and the training is documented at http://erinternal.lanl.gov/Training/Trainingmain.shtml in accordance with LANL-ER-QP-2.2.

3.2 The **Field Team Leader** (**FTL**) shall monitor the proper implementation of this procedure and ensure that relevant team members complete all applicable training assignments in accordance with LANL-ER-QP-2.2.

## 4.0 DEFINITIONS

4.1 *Grab samples* — A specific location at a given time is represented by a discrete aliquot. The sample is collected all at once and at only one particular point in the sample medium.

4.2 *Site-Specific Health and Safety Plan (SSHASP)*—A health and safety plan that is specific to a site or ER-related field activity that has been approved by an ER health and safety representative. This document contains information specific to the project including scope of work, relevant history, descriptions of hazards by activity associated with the project site(s), and techniques for exposure mitigation (e.g., personal protective equipment [PPE]) and hazard mitigation.

4.3 *Surface water samples*— Water collected from streams, ponds, lagoons, seeps, springs, rivers, lakes, or other water flowing or impounded at the ground surface comprise surface water samples.

4.4 *Automated samplers*—Automated samplers collect surface water without sampler being present. There are many types of automatic samplers. Follow manufacturer's instructions when using an automatic sampler.

## 5.0 BACKGROUND AND PRECAUTIONS

5.1 This SOP shall be used in conjunction with an approved SSHASP. Also, consult the SSHASP for information on and use of all PPE.

5.2 There are several methods for collecting surface water samples. The **Sampler** or **Field Team Leader** should decide which of the following methods is most appropriate. The method used to collect samples should be documented in the Field Notebook or on the Daily Activity Log.

5.2.1 One method for collecting a surface water sample is to use a peristaltic pump. The pump system allows the union of the filtration assembly with the pump and the sample container. With this method, surface samples are filtered if needed, and collected directly with minimal elapsed time. The acceptible tubing is medical grade silcon, which is decontaminated according to LANL-ER-SOP-01.08 or replaced after every sample.

5.2.2 An alternative method is to collect surface water as grab samples. Samples can be collected using a transfer device constructed of polyethylene Teflon™, stainless steel, or glass. The transfer device is used to transfer liquid and liquid wastes from surface waters to a sample bottle. Field personnel must avoid using metal transfer devices for trace-metal analysis or plastic devices for sampling trace organics.

5.2.3 The water sample can be collected directly by dipping the collection bottle into the water and filling, removing, and capping it. This direct grab method requires the exterior of the sample container to be rinsed after collection to avoid spreading possible contamination.

5.2.4 Samples may be collected using automated samplers. There are many types of automatic samplers. Follow manufacturer's instructions when using an automated sampler.

## 6.0 RESPONSIBLE PERSONNEL

The following personnel are responsible for activities identified in this procedure.

6.1 ER Project Personnel

6.2 Field Team Leader

6.3 Sample Management Office

6.4 Subcontractors

## 7.0 EQUIPMENT

A checklist of suggested equipment and supplies needed to implement this procedure is provided in Attachment A.

## 8.0 PROCEDURE

### 8.1 Use Current Procedure

ER Project personnel may produce paper copies of this procedure printed from the controlled-document electronic file located at LANL, Environmental Restoration Project. However, it is each person's responsibility to ensure that they trained to and utilize the current version of this procedure. The author may be contacted if text is unclear. The Document Control Coordinator (DCC) may be contacted if the author cannot be located.

### 8.2 Document Procedure Deviations

Deviations from SOPs shall be made in accordance with LANL-ER-QP-4.2, Standard Operating Procedure Development, and documented in accordance with LANL-ER-QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities.

### 8.3 Notify the Sample Management Office

The **Sampler** or **Field Team Leader** shall coordinate the sampling effort with the Sample Management Office (SMO). The SMO will give guidance regarding sample containers, preservation, and shipment to the SMO.

### 8.4 Use a Planning Document

The **Sampler** or **Field Team Leader** should refer to the site work plan, sampling plan or other appropriate plan to locate the sampling sites along the surface water body and the appropriate decontamination area.

### 8.5 Calibrate Instruments

The **Sampler** or **Field Team Leader** should ensure that the measuring and test equipment is controlled in accordance with LANL-ER-QP-5.2, Control of Measuring and Test Equipment. Calibrate Instruments to be used for water quality readings. (If field chemistry readings are required). Refer to LANL-ER-SOP-06.02, Field Analytical Measurements of Groundwater or the instrument's operators manual for calibration requirements and instructons.

### 8.6 Record Calibration Process

The **Sampler** or **Field Team Leader** should record calibration and instrument model information in Field Notebook or Daily Activity Log.

### 8.7 Implement Decontamination Process

The **Sampler** or **Field Team Leader** should decontaminate all sampling equipment before taking the first sample and beween sampling intervals in accordance with LANL-ER-SOP 1.08, Field Decontamination of Drilling and Sampling Equipment.

### 8.8 Collect sample by using a Sampling Transfer Device, Direct Grab Method, Peristaltic Pump, or Automatic Sampler

8.8.1 If **Sampler** or **Field Team Leader** collects samples with a transfer device or direct grab method, follow the procedure outlined below:

- Review LANL-ER-SOP 1.02, Sample Containers and Preservatives for the appropriate size and type of sample containers and preservatives.
- Use the transfer device to fill the sample containers slowly;
- When transfering liquid, the sample stream should flow gently down the sidewall.
- For sampling some distance offshore, an extension device might be required.
- Decontaminate transfer device according to LANL-ER-SOP-01.08, Field Decontamination of Drilling and Sampling Equipment, or handle device as contact waste according to LANL-ER-SOP-01.06, Management of ER Project Wastes.
- Label sample containers and complete documentation (LANL-ER-SOP-01.02, Sample Containers and Preservation, and LANL-ER-SOP-01.04 Sample Control and Documentation).
- Perform field chemistry measurements on surface water being sampled (if required).
- Record the final, stable parameter readings on the Sample Collection Log or equivalent form for later submittal to the Records Processing Facility (if field chemistry measurements are required).
- If water is collected directly into the collection bottle, add preservatives after the sample is collected and if appropriate, filtered.

- Filter appropriate samples using a 0.45 μm pore size filter. The filter may be a flat membrane supported by a filter-holder assembly or may be an in-line cartridge filter. If the filter-holder assembly and/or peristlatic pump tubing is used, field personal must insure that it has been thoroughly cleaned and decontaminated. Filters coarser than 0.45 μm may be used to pre-filter however, the final filter size must be $\leq$ 0.45 μm. Flow a minimum of 100 ml of the sample through the filter and discard the filtered water before collecting a filtered sample for analysis. Follow LANL-ER-SOP-01.02 (Sample Containers and Preservation) when choosing the proper container and preservation technique for each analytical suite.
- Occasionally it may be necessary to collect a sample in the field and filter at another location. Reasons include it may not be practical to use filtration apparatus at a remote site or the water sample is too turbid to filter at the time of collection. If the latter is the case, allow the suspension in the water sample to settle before filtering and preserving. An appropriate container must be used when collecting water to be filtered off-site. For example, water destined for metals and anions analysis should be collected in a polyethylene bottle or carboy; organics must be transported in a glass container. Do not use the same container that is used to transport the unfiltered water from the field as the final container that is shipped to the analytical laboratory. All containers must meet the minimum cleanliness specifications described in LANL-ER-SOP-01.02, which is they must be pre-cleaned and certified by the vendor.
- Preserve and store the sample in accordance with LANL-ER-SOP 1.02.

8.8.2 If **Sampler** or **Field Team Leader** collects samples with a peristaltic pump, follow the procedure outlined below:

- Install clean peristaltic pump tubing according to manufacturer's instructions.
- Review LANL-ER-SOP 1.02, Sample Containers and Preservatives for the appropriate size of sample containers and preservatives.
- Place intake end of the tubing into the water to be sampled and turn on the pump.
- Keep the tubing away from the bottom to minimize the amount of sediment collected.

- Fill the bottles without agitating the water if possible.
- To collect filtered samples, connect the appropriate filter to the outlet end of the pump tube.
- When collecting filtered samples, follow filtering process described in 8.8.1.
- Label and preserve sample containers and complete documentation (LANL-ER-SOP-01.02, Sample Containers and Preservation, and LANL-ER-SOP-01.04 Sample Control and Documentation).
- Perform field chemistry measurements on surface water being sampled (if required).
- Record the final, stable-parameter readings on the Sample Collection Log or equivalent form for later submittal to the Records Processing Facility (if field chemistry measurements are required).

8.8.3 If **Sampler** or **Field Team Leader** collects samples with an automatic sampler, follow the procedure outlined below:

- Follow manufacturer's instructions for specific guidance in using an automatic sampler.
- Review LANL-ER-SOP 1.02, Sample Containers and Preservatives for the appropriate size of sample containers and preservatives.
- When collecting filtered samples, follow filtering process described in 8.8.1.
- Perform field chemistry measurements on surface water being sampled (if required).
- Record the final, stable parameter readings on the Sample Collection Log or equivalent form for later submittal to the Records Processing Facility (if field chemistry readings are required).
- Label and preserve sample containers and complete documentation (LANL-ER-SOP-01.02, Sample Containers and Preservation, and LANL-ER-SOP-01.04 Sample Control and Documentation).

### 8.9 Use a Reference Marker

The **Sampler** or **Field Team Leader** should place a reference marker (e.g., a wooden or metal stake with flagging) that includes the location identification number as close to the sampling location as possible.

## 9.0 REFERENCES

ER Project personnel using this procedure should become familiar with the contents of the following documents to properly implement this SOP.

**Note:** The Quality Management Plan and the QPs are found at http://erinternal.lanl.gov/home_links/Library_proc.shtml. To locate the below listed QPs and SOPs, see Section 8.1.

- LANL-ER-QP-2.2, Personnel Orientation and Training
- LANL-ER-QP-3.2, Lessons Learned
- LANL-ER-QP-4.2, Standard Operating Procedure Development
- LANL-ER-QP-5.2, Control of Measuring and Test Equipment
- LANL-ER-ER-SOP-01.02, Sample Procedure Development
- LANL-ER-ER-SOP-01.04, Sample Control and Field Documentation
- LANL-ER-ER-SOP-01.06, Management of Environmental Restoration Project Wastes
- LANL-ER-ER-SOP-01.08, Field Decontamination of Drilling and Sampling Equipment
- LANL-ER-ER-SOP-06.02, Field Analytical Measurements of Groundwater

## 10.0 LESSONS LEARNED

10.1 Prior to performing work, **ER Project personnel** should access the Department Energy lessons learned web page, located at Department Of Energy Lessons Learned and/or the Los Alamos National Laboratory lessons learned web page, located at Lessons Learned to find applicable lessons learned that might aid in the performance of their tasks.

10.2 During the performance of work, **ER Project personnel** shall identify, document, and submit lessons learned, as appropriate, in accordance with LANL-ER-QP-3.2, Lessons Learned, located at http://erinternal.lanl.gov/home_links/Library_proc.shtml.

## 11.0 RECORDS

The **FTL** is responsible for submitting the following records (processed in accordance with LANL-ER-QP-4.4, Record Transmittal to the Records Processing Facility) to the Records Processing Facility.

11.1 Sample Collection Logs

11.2 Chain of Custody/Request for Analysis Forms

11.3 Daily Activity Log or Completed Field Notebook

## 12.0 ATTACHMENTS

Attachment A: "Equipment and Supplies Checklist for Surface Water Sampling (1 page) located at http://erinternal.lanl.gov/Quality/users/forms.asp

**Using a token card, click here to record "self-study" training to this procedure.**

If you do not possess a token card or encounter problems, contact the RRES-ECR training specialist.

## Equipment and Supplies Checklist For Surface Water Sampling

- ☐ Peristaltic pump
- ☐ Filtration unit
- ☐ Filters
- ☐ Transfer Device (if needed)
- ☐ Wooden Stakes
- ☐ Flagging
- ☐ Bucket
- ☐ Stopwatch
- ☐ Sample Containers and Preservatives
- ☐ Water Quality Meters
- ☐ Disposable gloves
- ☐ Safety Glasses
- ☐ Sample Collection Logs
- ☐ Chain of Custody/Request for Analysis Forms
- ☐ Custody Seals
- ☐ Sample Container Labels
- ☐ Tubing for pump
- ☐ Ph Strips
- ☐ Preservatives
- ☐ Coolers (Appropriately labeled)
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____



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